

## CLAIMS:

1. A method of canceling a narrow-band interference signal in a receiver, comprising the steps of:
  - subtracting a reference signal (ref\_in) from a received input signal (in);
  - calculating the phase of a result of the subtraction on the basis of an
  - 5 arctangent function,
  - performing an unwrap function on the output signal from the arctangent function, by removing the modulo  $2\pi$  limitation introduced with the arctangent function, thereby producing an absolute phase representation,
  - determining a frequency offset by comparing phase representation values
  - 10 which are shifted predetermined in time, and
  - canceling the narrow-band interference signal based on the result of the determined frequency offset.
2. A method according to claim 1, characterized in that the unwrap function
- 15 accumulates  $k$  times  $2\pi$ , where  $k$  depends on the wrapped function so that  $k$  will be increased by 1 if the difference between the last corrected sample and the current sample is smaller than  $-\pi$ , and  $k$  will be decreased by 1 if the difference between the last corrected sample and the current sample is greater than  $\pi$ .
- 20 3. A method according to claim 1, characterized in that the subtracting step can be hold a predetermined period of time, if there is no reference signal available to perform the subtraction.
4. A method according to claim 2, characterized in that the unwrap function can
- 25 be hold a predetermined period of time, if there is no reference signal available to perform the unwrap function.

5. A method according to claim 2, characterized in that the canceling the narrow-band interference signal is performed by selecting a filter from within a filter-bank based on the value of  $k$ .
- 5 6. A method according to claim 2, characterized in that the canceling the narrow-band interference signal is performed by generating a second narrow-band signal, which corresponds to the narrow-band interference signal, and by subtracting the second narrow-band signal from the distorted desired wide-band signal.
- 10 7. An apparatus characterized in that the apparatus comprises
- a subtracting unit (SU) for subtracting a reference signal (ref\_in) from a received input signal (in);
  - a complex phase calculator for calculating the phase of a result of the subtraction signal on a sample-by-sample basis of the in-phase and quadrature components of
  - 15 the signal and performing an arctangent function on the in-phase and quadrature components of the incoming signal,
  - a phase unwrap module for removing discontinuities in the phase if the phase passes the in-phase axes in the complex plane with an absolute value greater than  $\pi$ ,
  - a comparator module arranged to compare the difference in phase signal
  - 20 values at predetermined time intervals, the difference in said values representing an frequency offset in the subtracting signal, and
  - a canceling means for canceling the narrow-band interference signal based on the result of the determined frequency offset.
- 25 8. An apparatus according to claim 7, characterized in that the phase unwrap module is adapted to accumulate  $k$  times  $2\pi$ , where  $k$  depends on the wrapped function so that  $k$  will be increased by 1 if the difference between the last corrected sample and the current sample is smaller than  $-\pi$ , and  $k$  will be decreased by 1 if the difference between the last corrected sample and the current sample is greater than  $\pi$ .
- 30 9. An apparatus according to claim 8, characterized in that the canceling means comprises a filter-bank, wherein the narrow-band interference signal is canceled by selecting a filter from within said filter-bank based on the value of  $k$ .

10. An apparatus according to claim 7, characterized in that the canceling means comprises a generating means for generating a second narrow-band signal, which corresponds to the narrow-band interference signal, and a subtracting means for subtracting the second narrow-band signal from the distorted desired wide-band signal.